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PRODUCING FIBER-BOARD BY INDIGENOUS METHOD

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SEVERAL GOALS FULFILLED BY BUILDING AND INSTALLATION ENTERPRISES IN 1959

- COMMUNIST CHINA -

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[Following is the translation of an extract from an article written by the Timber Management Section, T'ang Hsien Agriculture-Forestry Bureau, Hopeh Province, in Kung-ch'eng Chien-she (Engineering Construction), Peiping, No. 9, 15 May 1960, pages 38-39.]

Under the correct guidance of the various levels of the Party and government, and under the brilliance of the general line, the Timber Management Section, in obedience to Central Government instructions to utilize local materials, self-provide, make the best use of local conditions, employ native methods, combine native and foreign methods, and co rdinate large, medium and small enterprises into a "walking on two-legs" movement, has succeeded in the trial manufacture of fiber-board. At present, a small plant with a 150-ton fiber-board annual production has been established, and production has begun on a large scale.

The special features of this native production method for fiber-board are: (1) low production cost--the cost of one cubic meter is 179 yuan (256 pieces in one cubic meter); (2) plenty of raw materials--all tree branches, grass, and husks can be made used; (3) many uses--tables, chairs, and other furniture; (4) high efficiency--24 workers can produce more than 200 pieces a day; (5) simple methodology--no complicated machines are needed and everybody can make it. In sum, the whole process is in the spirit of more, faster, better and cheaper.

The technological phases of the production equipment are all native. The time since the establishment of the plant is still rather short; there are many operational defects that must be corrected immediately. The Timber Management Section admist that it has not gained much experience yet, however, it merely desires to present a brief description of its method so that everybody may voice opinions.

Production Technique

The technical procedure of producing fiber-board by the native method and the workshop ground plan are shown in Figure 1.

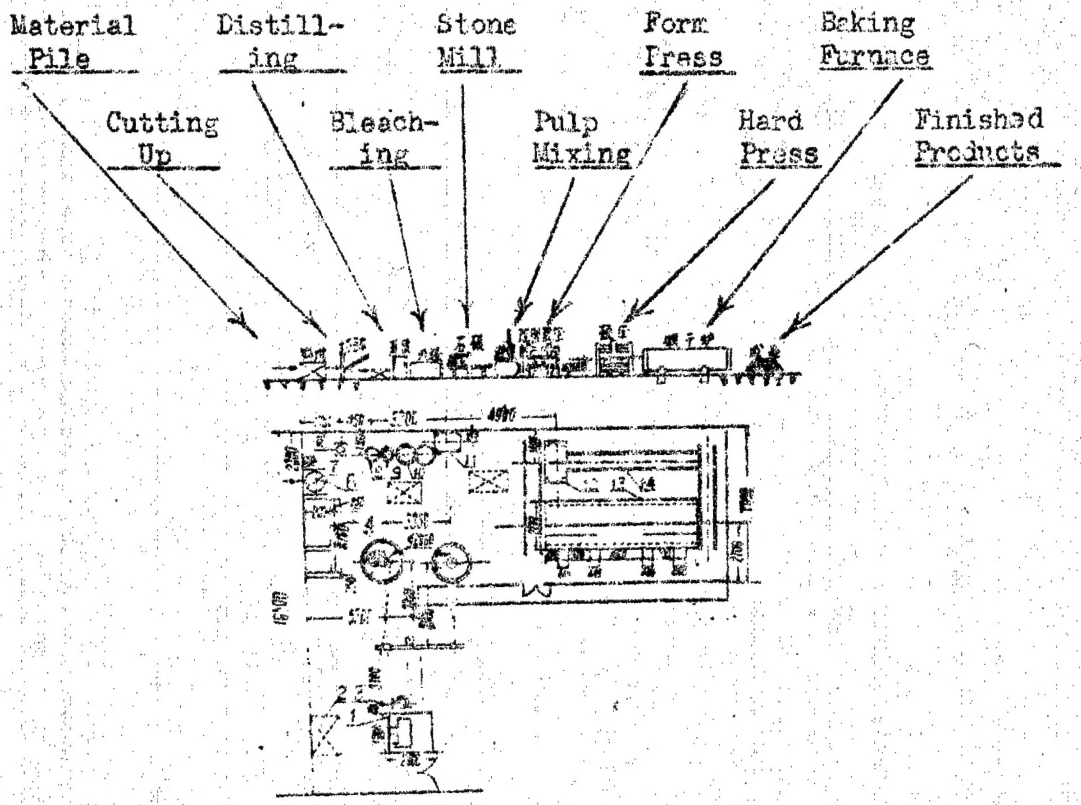

Figure 1
(Top) Technical Procedure of Native Method to Produce Fiber-board.
(Bottom) Workshop Ground Plan

1-Boiler; 2-Coal Pile; 3-Boiler Engine; 4-Stone Mill; 5-Bleaching Tank; 6-Resin Pot; 7-Well; 8-Alum Tank; 9-Resin Storage Tank; 10-Pulp Mixing Tank; 11-Form Preliminary Press; 12-Hard Press; 13-Baking Furnace; 14-Tracks.

A. Raw Material Cutting: The various types of raw materials are cut up into 20-30 millimeter lengths with a lever-knife or a grass cutting machine. Soft fibers need no cutting and can be distilled directly. After cutting, hard fibers (such as reed stalks) should be crushed by a stone mill to shorten distilling time. In cutting, attention must be given to the uniform length of the pieces, so as to guarantee even quality.

B. Distilling: There are two distilling methods--one is soda ash treatment and the other is lime water treatment. According to present conditions, the lime water treatment is low in production cost and plenty of raw materials are available.

1. The soda ash treatment: put the raw materials into a distilling pot. With dried raw materials, add 7-10% soda ash (this amount may be increased or decreased in accordance with the nature of the raw material). Distilling time: steaming 3-4 hours, simmering 5-6 hours. This time may be prolonged, if necessary, until the raw materials become a soft paste-like substance so that the fibers will be easily separated.

2. Lime water treatment: The amount of lime used varies with the nature of the raw materials; for instance, wheat stalks 20%, reeds 30%, wood shavings 30-40% (according to the nature of the wood). Operational procedure: First, put the lime into a container, add water to dissolve it thoroughly. Then, put the milk of lime into a tank, into which the raw materials are soaked for one to two minutes. Take them out and in three minutes' time, heap them into a pot. Fill the pot with water, with the raw materials one meter above the water level. Then, smear the material pile solid with mud. The amount of distilling time required depends on the nature of the raw materials. Test results have shown: for smooth stalks, steaming 48 hours, simmering 12 hours; for reeds and wood shavings, steaming 72 hours, simmering 12 hours.

C. Pulp making (separating fibers): Use stone mill to make pulp. Before making the pulp, the distilled raw materials should be thoroughly washed with water and bleached. During the operation, the raw materials must be turned over frequently so that the fibers will be separated evenly and rapidly. The quality desired must be: the materials can be dissolved in water, the fibers should not be too coarse nor too fine; if too coarse, the finished products will be crude and affect the smoothness of the surface; if too fine, it will be

difficult to extract the water and too much waste. The suitable length for the fibers is 5-8 millimeters.

D. Pulp Mixing:

1. Add milk of resin (50% of dried fiber).

2. After milk of resin is added into the tank, stir for 10 minutes, then add the diluted alum solution into the tank.

After the above two water-proof solutions are added to the fibers, stir till even and it is ready for form making.

E. Form Preliminary Pressing: In accordance with fiber-board specifications, such as size and thickness, the amount of pulp is determined. Put the proper amount of pulp into a wooden frame. Underneath this frame there is placed an iron wire screen. Spread the pulp evenly in the wooden frame. The water in the pulp will drip through the bottom of the frame. Smooth the top surface. Add another iron wire screen and plate. Then use a jack to press down gradually. In this preliminary pressing, the weight must be exerted evenly to prevent uneven thickness. When pressing has reached a certain degree and when 70% of the water in the pulp has been drained off, then, take off the wooden frame.

F. Hard Pressing and Baking:

1. After water is drained from the brick board, it is covered with an aluminum plate and the bottom is set with an iron screen. The top faces out and the bottom in. Then, the brick is put on the press (two bricks pressed at a time). A 10-millimeter steel plate is put on top and another at the bottom to insure the correct shape of the board.

2. The press is operated by a 10-ton oil pressure jack (it gives a pressure reaching 25 kilograms per square centimeter). There are 4-6 such weights used for pressing. Under this operation, all moisture is squeezed out. Then, the top and bottom plates should be bound together by twist groove screws. The bricks are put on the cart and carried to the baking furnace for the drying process.

3. Baking is done in an automatically ventilated kiln. The temperature in the kiln must be maintained at 280-300°C. From brick to finished product, the time required is 80-90 minutes.

The baking temperature should not be lower than 280°C. If the temperature is too low, it would affect the hardening of the fibers, reduce the board's ability to resist water, and make its surface not as smooth.

At the same time, the brick may stick to the plate causing spoilage. Because there are no instruments, the baking process relies on the eyes and nose of the kiln operator to see and to smell. The operator must be able to see the difference of the brick's color. When the color is white and some moisture is dripping, the board is not done yet. When the color becomes brown and no smoke comes out, the board is well done. But when the color becomes black and a black smoke rises, the board is burnt. The operator must also be able to smell the odor from the brick. When the board is not yet done, it has a musty paste odor. When it is well done, it has the fragrance of fresh biscuits from the oven. When it is burnt, it has an offensive odor.

4. Heat dissipating process: Remove the bricks from the kiln and put them into a 60-80° warm oven, to allow gradual cooling.

G. Method for making milk of resin:

1. Recipe: resin 1 part, water 2 part, soda ash 0.15 part.

2. Direction: First boil the water, add soda ash. After the soda ash is dissolved, add resin and stir continuously until the resin solution becomes transparent, and when it can be dissolved in 80° warm water. At this stage, the resin solution becomes milk white. This is a resin glue, which should be stored for use.

3. Making milk of resin: Dissolve the resin glue in 80° hot water to the density of 1:25 (water 100 parts to resin 4 parts), then the solution is ready for use.

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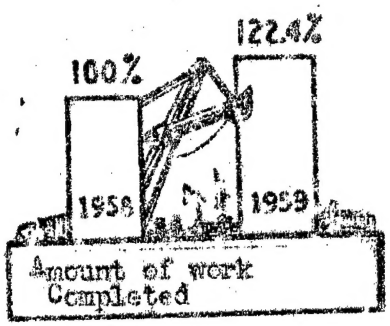
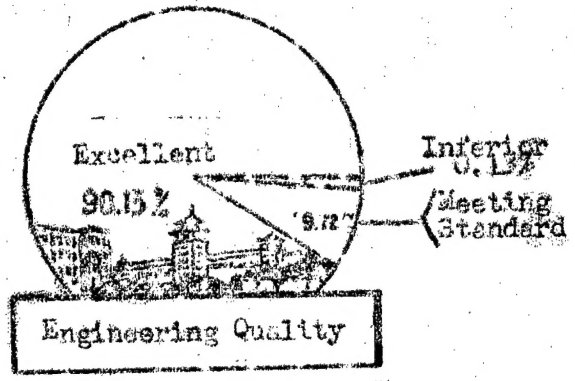
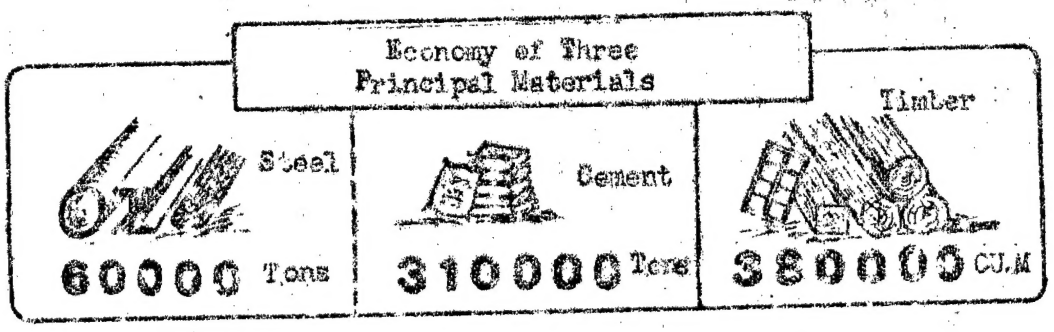
[Following is a chart from Kung-ch'eng Chien-she (Engineering Construction), Peiping, No. 5, 10 March 1960, page 41.]







Building Installation Enterprise Multifaceted Undertakings	Steel Production 10365 Tons	Pig Iron 28425 Tons	Cement 182467 Tons
Lime 293797 Tons	Fired & Unfired Bricks 47,257,000	Sand Stone Cu.M 9990000	Fiber Glass 2415 Tons

10,010

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